

1924: Discovery of X-ray spectroscopy

Contributions

Manne Siegbahn's improvements and new constructions of air pumps and X-ray tubes(Fig.1) enabled a considerable increase of the radiation intensity, and the numerous spectrographs and crystal or linear gratings which he constructed, have resulted in a highly increased accuracy of his measurements. In this way, a large number of new series within the characteristic X-radiations of elements could be discovered. The new precision technique thus developed by Siegbahn led to a practically complete knowledge of the energy and radiation conditions in the electron shells of the atoms, while at the same time a solid empirical foundation was created for the quantum-theoretical interpretation of attendant phenomena.



Manne Siegbahn(1886-1978)



Figure 1

Applications



Siegbahn's spectrographs which are held at a constant temperature and read, in tenths of seconds, by means of two microscopes mounted diametrically opposite one another on a precision goniometer(Fig.2) are used to measure energy-level values of X-rays.



Wavelength dispersive X-ray spectroscopy. In an energy-dispersive X-ray spectrometer semiconductor detector measures energy of incoming photons. To maintain detector integrity and resolution it should be cooled with liquid nitrogen or by Peltier cooling.(Fig.3)

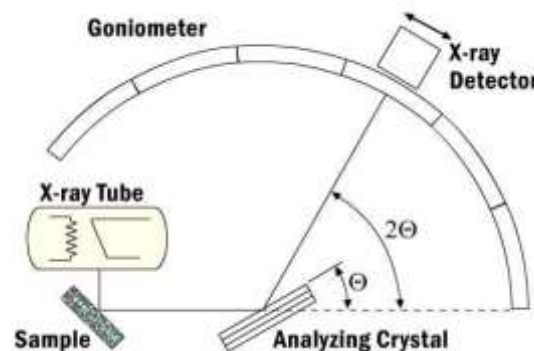


Figure 2

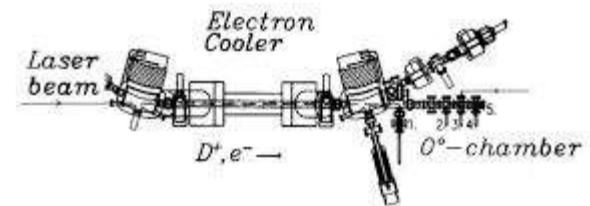


Figure 3